

Detailed Description of the Illustrated Embodiment

The illustrated embodiment provides *inter alia* for management of a storage area network (SAN) generally having a plurality of hosts that are coupled with one or more storage devices via an interconnect fabric for purposes of storing and retrieving information. The embodiment utilizes a manager and one or more agents, each of the latter being associated with at least one of the hosts and serving as "proxies" for the manager, gathering status, attributes and other such information regarding the hosts, the storage devices, and the interconnect fabric. The manager collates that information to discern the makeup, topology and status of the SAN and its components, to apprise an administrator or other operator of the same (and of changes thereto), and to implement an administrator-defined or other policy, e.g., by way of non-limiting example, for assignment and unassignment of storage devices (e.g., logical units) to the hosts.

FIGURE 1 illustrates an exemplary storage network management environment according to the present invention in which a plurality of hosts 12a, 12b, and 12c, herein collectively referred to as hosts 12 or alternatively as managed hosts 12 communicate with a plurality of storage devices 14a, 14b, and 14c, herein collectively referred to as storage devices 14, via an interconnect fabric 16 having a plurality of interconnect elements, such as, a switch 16a. Though hosts 12 are typically web or file servers (for client computers which are not shown in the drawing), graphical workstations and so forth, they may comprise any digital data device that accesses and/or stores (collectively, "accesses") information on the storage devices 14. The hosts, moreover, may run a variety of operating systems, by way of non-limiting example, Windows 2000, Windows NT, Solaris, and Linux. The hosts are constructed and operated in the

conventional manner known in the art, as modified in accord with the teachings herein (by way of non-limiting example, through incorporation of agent functionality as described in still further detail below).

- 5 Storage devices 14 comprise apparatus for storing and/or retrieving data. These typically comprise disk drives and arrays of the type conventionally used in storage area networks, though any variety of storage devices may be used for this purpose. Illustrated devices 14 are constructed and operated in the conventional manner as modified in accord with the teachings herein.

Per convention, physical storage devices, e.g., a single disk drive or an array of disk drives, are logically divided or grouped in to logical units. This is typically accomplished via a controller (not shown) associated with each physical device. The controller is configured for this purpose by an administrator, by factory default, or otherwise, in a manner conventional in the art and not
 5 further discussed herein. Once configured, the controller responds to queries (e.g., directed to Page 83h and/or Standard Page commands of the SCSI protocol) to identify the logical units -- typically by way of, for example, an identifier referred to as a logical unit number or LUN -- and (to the extent relevant) the physical device(s) on which they are contained.

- 20 The controller attends to data accesses directed to those logical units by retrieving and/or storing data at locations allocated to those units within the physical devices -- typically, without applications program, file system or operating system concern for the specifics (or even the existence) of such allocations. In this light, unless otherwise evident from context, the term

“storage device” in relation to the illustrated embodiment refers to logical units, though in alternate embodiments it can refer to physical devices.

In the illustrated embodiment, hosts 12 are coupled for communication with one another, as well as with a SAN manager 20, via a local area network (LAN) 18 that utilizes the TCP/IP protocol. Other networks configurations, types and/or protocols may be used for this purpose, including, by way of non-limiting example, wide area networks, metropolitan area networks, regardless of media (wired, wireless, satellite or otherwise) and protocol.

Hosts 12 are coupled to storage devices 14 via interconnect 16 for purposes of transferring data and commands therebetween. In the illustrated embodiment interconnect 16 comprises a fiber channel fabric, including fiber channel media, switches, and other componentry necessary, typical and/or otherwise used to provide fiber channel connectivity between the illustrated devices 12, 14. In alternative embodiments, interconnect 16 utilizes other fabrics, networks or other communications media for transfers between hosts 12 and devices 14, with high-speed fabrics. Indeed, such transfers can be conducted over LAN 18, which also couples these devices.

SAN Manager and Agents

The illustrative SAN environment 10 includes a SAN manager 20 that can include one or more software modules that collectively manage SAN 10 by collating that information to discern the makeup, topology and status of the SAN and its components, to apprise an administrator or other operator of the same (and of changes thereto), and to implement an administrator-defined or